FORM PTO-1390 (REV. 9-2001) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)
10/031704

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/EP00/06117	June 30, 2000	July 23, 1999

TITLE OF INVENTION
AN INSPECTION DEVICE FOR COMPONENTS

APPLICANT(S) FOR DO/EO/US
Peter BOLLINGER

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [X] This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (21) indicated below.
4. [X] The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [ ] is attached hereto (required only if not communicated by the International Bureau).
   b. [X] has been communicated by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [X] An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. [X] is attached hereto.
   b. [ ] has been previously submitted under 35 U.S.C. 154(d)(4).
7. [ ] Amendments to the claims of the International Aplication under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are attached hereto (required only if not communicated by the International Bureau).
   b. [ ] have been communicated by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371 (c)(3)).
9. [X] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). (unexecuted, executed to follow)
10. [ ] An English lanugage translation of the annexes of the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 20 below concern document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
14. [ ] A SECOND or SUBSEQUENT preliminary amendment.
15. [ ] A substitute specification.
16. [ ] A change of power of attorney and/or address letter.
17. [ ] A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
18. [ ] A second copy of the published international application under 35 U.S.C. 154(d)(4).
19. [ ] A second copy of the English language translation of the international application under 35 U.S.C. 154(d)(4).
20. [ ] Other items or information:

531 Rec'd PCT/PTO 23 JAN 2002

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)	INTERNATIONAL APPLICATION NO.	ATTORNEY'S DOCKET NUMBER
10/031704	PCT/EP00/06117	

21. ☒ The following fees are submitted:	CALCULATIONS PTO USE ONLY
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)):	
Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1040.00**	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$890.00**	
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$740.00**	
International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$710.00**	
International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**	
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 890.00
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$ 130.00

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE	
Total claims	9 - 20 =	0	x **$18.00**	$ 0
Independent claims	1 - 3 =	0	x **$84.00**	$ 0
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ **$280.00**	$ 0
TOTAL OF ABOVE CALCULATIONS =				$ 920.00
☐ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/2. +				$
SUBTOTAL =				$ 920.00
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				$
TOTAL NATIONAL FEE =				$ 920.00
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **$40.00** per property +				$ 0
TOTAL FEES ENCLOSED =				$ 920.00
			Amount to be refunded:	$
			charged:	$

a. ☒ A check in the amount of $ 920.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of $ _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 50-1716. A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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Dated: January 23, 2002

SIGNATURE

Vincent L. Ramik
NAME

20,663
REGISTRATION NUMBER

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re PCT Patent Application of:

Peter **BOLLINGER**

PCT/EP00/06117

International Filing Date: June 30, 2000
Filed in DO/US: **January 23, 2002**

AN INSPECTION DEVICE FOR COMPONENTS

January 23, 2002

Box PCT
Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Sir:

Contemporaneously with the filing of the above-captioned PCT designated office patent application and prior to examination on the merits thereof, please amend the application as follows:

IN THE SPECIFICATION:

Page 1, line 1 (the title), insert the following heading:

-- TITLE OF THE INVENTION --;

and

Page 1, before paragraph [0001], kindly insert the following heading:

-- BACKGROUND OF THE INVENTION --.

Page 2, before paragraph [0005], kindly insert the following heading:

-- SUMMARY OF THE INVENTION --;

and

Page 2, paragraph [0006], cancel in its entirety.

Page 4, cancel paragraph [0015] and replace with the following heading:

-- BRIEF DESCRIPTION OF THE DRAWINGS --.

Page 5, between paragraphs [0022] and [0023], kindly insert the following heading:

-- DESCRIPTION OF THE PREFERRED EMBODIMENTS --.

Page 9, after the last paragraph [0034], kindly insert the following new paragraph:

(New) **[0035]** Although a preferred embodiment of the invention has been specifically illustrated and described herein, it is to be understood that minor variations may be made in the apparatus without departing from the spirit and scope of the invention, as defined the appended claims.

IN THE CLAIMS:

After the heading "Claims" and before claim 1, insert the following new paragraph:

(New) What is claimed is:

Kindly cancel all of the claims presently of record and substitute therefor the following newly drafted claims:

10. (New) An inspection device for components (11), comprising a video camera (40) recording a first picture (28) of the component (11) from a first direction (23), and an optical deflection device (30) which supplies a second picture (29) of the component (11) to the video camera (40), the second picture being taken from a direction (24) different from the first direction (23), and both pictures (28, 29) are reproduced at different locations of the video image produced by the video camera characterized in that the directions from which the two pictures are taken are directed to different sides of the recording area and that a length compensation device (27) is provided in the beam path (25) of one of the pictures (28, 29) between the component (11) and the video camera (40), for making the length of this beam path equal to that of the other beam path (26).

11. (New) The inspection device as defined in claim 10 wherein the beam paths (25, 26) of both pictures (28, 29) are incident in parallel into the video camera (40).

12. (New) The inspection device as defined in claim 10 wherein a beam combining device (18) is provided that directs the pictures of two spaced components (11, 11a) simultaneously to the video camera (40).

13. (New) The inspection device as defined in claim 11 wherein a beam combining device (18) is provided that directs the pictures of two spaced components (11, 11a) simultaneously to the video camera (40).

14. (New) The inspection device as defined in claim 10 wherein a first illumination device (31) is provided that illuminates the component (11) to generate the first picture (28), and a second illumination device (35) is provided that illuminates the component (11) for generating the second picture (29), and that the illumination devices (31, 35) emit light of different light characteristics such that the light of one picture is not affected by the illumination of the other picture.

15. (New) The inspection device as defined in claim 14 wherein the different light characteristics are different wavelengths.

16. (New) The inspection device as defined in claim 10 wherein one illumination device (31) illuminates the component (11) directly at the same side where the picture (28) is taken, and that the other illumination device (35) illuminates the component (11) with counter light.

17. (New) The inspection device as defined in claim 10 wherein at least one illumination device (31) comprises a light source (32) mounted for rotation about the main beam axis (34) and connected to a deflection device (33) rotating together therewith.

18. (New) The inspection device as defined in claim 10 wherein an illumination device (31) comprises two light sources (32), and that the beam path (25) of one of the pictures (28) passes between these light sources.

IN THE ABSTRACT:

Line 2 (the title), delete in its entirety;

and

Last line ((Fig.2)), delete in its entirety.

... Remarks continued on page 6...

REMARKS

Commensurate with the filing of the national phase of this application, the Examiner is respectfully requested to introduce this amendment in order that all multiple dependent claims are cancelled, the appropriate headings are inserted and both the government filing fee and examination are based upon the claims of record after the introduction of the present amendment.

Upon entry of this amendment, favorable consideration on the merits of the claims is respectfully solicited.

Respectfully submitted,

DILLER, RAMIK & WIGHT

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An inspection device for components

[0001] The present invention refers to an inspection device for components, comprising a video camera recording pictures of the component.

[0002] In series production, components are inserted into circuit boards using component mounting automats that move the respective component to its position for soldering or bonding. The components, which are often miniaturized components of a size ranging from 1 to 10 mm, have to be inspected prior to being inserted so as to ensure that the component is intact in order to be processed. In particular, it has to be ensured that all legs of the component are present and take the correct position. Typically, such inspection is effected with a video camera and a connected computer adapted for image processing and comparing the recorded video image with a pre-stored standard image of the component. Thus, it can be determined without any human interference, whether an object to be mounted or processed otherwise is intact.

[0003] For a complete inspection, it is necessary to record the component from various directions. In a picture taken from only one direction, defects of the component may be covered.

[0004] With miniaturized components, it is difficult for reasons of space to take a plurality of pictures at the same time using the necessary several video cameras.

[0005] It is the object of the present invention to provide an inspection device for components that allows for a simultaneous recording of pictures of a component, taken from different directions, the device further being suited for miniature components.

[0006] According to the invention, the object is solved with the features defined in claim 1.

[0007] In the present inspection device, a single video camera takes a plurality of pictures of the component from different directions, an optical deflecting device being disposed in the beam path of at least one of the pictures. Thus, both pictures taken simultaneously from different directions can be supplied to the video camera from the same receiving direction so that both pictures can be reproduced in different areas of the video image. According to the invention, a single video camera is used to reproduce a plurality of pictures. Thus, also the evaluation of the pictures is effected by automatic image processing using a single video image. The inspection device can be used in very restricted space and has particular applicability in evaluating and assessing miniature components, since it is not necessary to direct several video cameras on a single component.

[0008] As the video camera, particular use lies with a CCD camera with a sensor field of charge storage elements that are influenced by light signals. The different images may fall in parallel on the objective of the camera, but they are laterally offset from each other so that they will not overlap.

[0009] In a preferred development of the present invention, a length compensation device is arranged in the beam path of one of the pictures between the component and the video camera, equalizing the length of this beam path to that of the other beam path. Thus, both pictures are focused in common by the video camera. The length compensation device may comprise mirrors or, preferably, a prism arrangement causing a meander-like beam path.

[0010] The invention provides the possibility to image and evaluate a plurality of components simultaneously using the video camera. To this end, a beam combining device is provided that supplies the pictures of two spaced apart components to the video camera at the same time. Such a beam combining device comprises a mirror device or a prism arrangement. Its application requires that the components are simultaneously present at two defined spaced positions.

[0011] A defined and reproducible inspection requires defined illumination conditions. In illuminating the object, glaring and similar influences must be avoided. In a development of the invention, two illumination devices are provided, one of which is meant for the first picture, while the other is meant for the second picture of the component. Both illumination devices emit light with different light characteristics, such that the light of one picture is not disturbed by the light of the other picture. The different light characteristics may be, for example, different wavelengths or different polarization directions. What matters is that a selective illumination is effected for each picture that cannot be sensed by

the other picture. The recorded pictures may be separated by corresponding filters.

[0012] In a preferred embodiment of the invention, an illumination device illuminates the component vertically on the same side from which the picture is taken, while the other illumination device illuminates the component with opposite light. The recording directions of both pictures are preferably at right angles relative to each other.

[0013] When the illumination devices emit light having different wavelengths, the video camera used may be a monochrome or a polychrome camera. With a monochrome camera it must be ensured that it is sensitive to both wavelengths selected.

[0014] The following is a detailed description of an embodiment of the present invention with reference to the accompanying drawings.

[0015] In the Figures:

[0016] Fig. 1 is a schematic side elevational view of an inspection device,

[0017] Fig. 2 is a view in the direction of the arrow II in Fig. 4,

[0018] Fig. 3 is a schematic view of the assembled inspection device, seen from the same direction as in Fig. 1,

[0019] Fig. 4 is a view on Fig. 3 seen in the direction of the arrow IV,

[0020] Fig. 5 is an illustration of the video picture generated in the video camera,

[0021] Fig. 6 is a mechanical representation of the illumination devices directed towards the component, and

[0022] Fig. 7 is view in the direction of the arrow VII of Fig. 6.

[0023] The inspection device comprises several supporting devices 10, which in the present case are aspirating pipettes aspirating air through a thin intake opening, thereby drawing the component 11 towards the air intake opening and holding it there. The supporting devices 10 are arranged in a row along a continuous conveyor indexed according to the respective machine cycle.

[0024] In this instance, the components 11 are, for example, transistors with a body 12 and legs 13, 14 projecting therefrom in opposite directions. Two legs 13 project to one side and one leg 14 projects to the other side. The legs are angled twice and each have a rest portion 15 set flat on a circuit board and soldered to a conductor path. Among other things, the inspection device checks whether all legs 13 and 14 are present and whether they are correctly positioned.

[0025] As illustrated in Fig. 1, recording positions 16, 17 are provided at two positions along the conveying path of the supporting devices 10, the components 11, 11a being imaged at these positions by a video camera. A beam combining device 18 of a first prism 19 and a second prism 20 extends between these two recording positions. Each of the prisms 19, 20 directs a picture of a respective component 11 and 11a to the objective 21 of the camera, the beam paths of both pictures being represented by dotted lines. It can be seen that both pictures are input in parallel into the objective 21, yet with a lateral offset, so that both pictures are imaged on different locations on the sensor of the video camera. The beam paths from both components 11, 11a to the objective 21 are illustrated in dotted lines in Fig. 1. These beam paths first extend in parallel at a great distance, then they converge at right angles and eventually enter the objective 21 in parallel and close to each other.

[0026] The beam combining device 18 and the recording positions 16, 17 are located within an attachment 22 to the objective mounted to the front of the objective 21 of the video camera. The supporting devices 10 move along this attachment 22.

[0027] Fig. 2 illustrates a component 11 sucked and held by a supporting device 10, seen in the direction of the arrow II in Fig. 1. The component is recorded by a video camera from a first direction 23 (from below) and a second direction 24 (from the side). Both directions 23, 24 extend at right angles to each other. The direction 23 is part of a beam path 25 and the direction 24 is part

of a beam path 26. The directions 23, 24 indicate the viewing direction of the video camera. The light beams, however, run in the opposite direction from the component to the video camera.

[0028] In the beam path 25, a length compensation device 27 of two prisms is provided that prolongs the beam path 25 and makes it of a length equal to the other beam path 26. The fact that both beam paths 25, 26 have substantially the same length ensures that both pictures can be focused at the video camera. The length compensation device 27 is designed such that the incoming beam and the emitted beam are in parallel.

[0029] Fig. 5 illustrates the video image generated by the two components 11, 11a. The component 11 is represented in two pictures 28, 29, the picture 28 being a top plan view and the picture 29 being a side elevational view. The component 11a is also represented in two pictures 28a, 29a. All four pictures are commonly generated on the sensor screen of the video camera and may be displayed in common on a monitor.

[0030] The beam path 26 that first runs parallel to the beam path 25 is deflected by a right angle by means of a optical deflecting device 30 so as to meet the component 11 from the side following the direction 24.

[0031] The illumination of the component is effected for each of the two pictures 28, 29 using light with different characteristics. A first illumination device 31 (Figs. 6 and 7) illuminates the component 11 from below. This illumination device 31 comprises

two light sources 32 that are arranged horizontally, their light being directed vertically upward by a respective prism 33. Together with the associated prism 33, the light sources 32 may be rotated about the main emission axis 34 and adjusted to set different tilting angles, as illustrated in Fig. 7 at 34. The light sources are arranged at a mutual distance so that each light source is located obliquely below the component 11. The beam path of the video camera passes between the two light sources 32. The bottom surface of the component 11 is recorded in direct light by illuminating the same directly using the illumination device 31.

[0032] The second illumination device 35 is arranged laterally beside the component 11 on the side opposite the recording side. This means that the recording direction 24 points to the illumination device 35. From this direction 24, the component 11 is recorded in counter-light, i.e., the picture shows a corresponding silhouette of the component.

[0033] The illumination devices 31, 35 operate with light of different wavelengths. The light sources of the illumination device 31 may, for example, emit red light, while those of the illumination device 35 emit green light. Accordingly, as illustrated in Fig. 2, a red filter R is provided in the beam path 25, which allows only red light to pass, whereas a green filter G is disposed in the beam path 26, allowing only green light to pass. Thus, the picture 28 is taken in red light and the picture 29 is taken in green light. Both types of light do not interfere with each other and, in particular, no disturbing glare occurs.

[0034] Figs. 3 and 4 illustrate the structure of the inspection device. Immediately in front of the objective 21 of the video camera 40, the attachment 22 is mounted which includes the elements illustrated in Figs. 1 and 2. The objective 21 of the camera 40 is fastened to the machine frame through a holder 41. An angular support 43 carries the Illumination device 31. Screws 44 fasten the light source 32 to this angular support. The prism 33 that directs the light from the light source 32 upward, is located below the course of the support devices 10. The components 11 are moved along this course with their legs 13, 14 directed forward and backward. The illumination device 35 is provided as a light emitting diode array on the angular support 43.

Claims:

1. An inspection device for components (11), comprising a video camera (40) recording a first picture (28) of the component (11) from a first direction (23),

   characterized in

   that an optical deflection device (30) is provided which supplies a second picture (29) of the component (11) to the video camera (40), the second picture being taken from a direction (24) different from the first direction (23), and both pictures (28, 29) are reproduced at different locations of the video image produced by the video camera.

2. The inspection device of claim 1, characterized in that a length compensation device (27) is provided in the beam path (25) of one of the pictures (28, 29) between the component (11) and the video camera (40), for making the length of this beam path equal to that of the other beam path (26).

3. The inspection device of claim 1 or 2, characterized in that the beam paths (25, 26) of both pictures (28, 29) are incident in parallel into the video camera (40).

4. The inspection device of one of claims 1-3, characterized in that a beam combining device (18) is provided that directs the pictures of two spaced components (11, 11a) simultaneously to the video camera (40).

5. The inspection device of one of claims 1-4, characterized in that a first illumination device (31) is provided that illuminates the component (11) to generate the first picture (28), and a second illumination device (35) is provided that illuminates the component (11) for generating the second picture (29), and that the illumination devices (31, 35) emit light of different light characteristics such that the light of one picture is not affected by the illumination of the other picture.

6. The inspection device of claim 5, characterized in that the different light characteristics are different wavelengths.

7. The inspection device of one of claims 1-6, characterized in that one illumination device (31) illuminates the component (11) directly at the same side where the picture (28) is taken, and that the other illumination device (35) illuminates the component (11) with counter light.

8. The inspection device of one of claims 1-7, characterized in that at least one illumination device (31) comprises a light source (32) mounted for rotation about the main beam axis (34) and connected to a deflection device (33) rotating together therewith.

9. The inspection device of one of claims 1-8, characterized in that
an illumination device (31) comprises two light sources (32), and that the beam path (25) of one of the pictures (28) passes between these light sources.

Abstract of the disclosure

An inspection device for components

The components (11) to be examined are held by suction at a support device (10) and inspected by a video camera. The workpiece is recorded from two different sides via different beam paths (25, 26) using the same video camera, wherein two pictures of the same object are reproduced in different views and evaluated by image processing. Thus, it can be determined whether the component (11) is intact and, in particular, whether its legs (13) are present and at the correct place.

(Fig. 2)

FIG.1

II
10
17
11a
31
22
20
18
21
19
32
10
11
14
15
12
13
15
32
31
16
25,26

FIG.2

30
22
26
24
10
11
12
13
23
25
27
R
G

FIG. 3

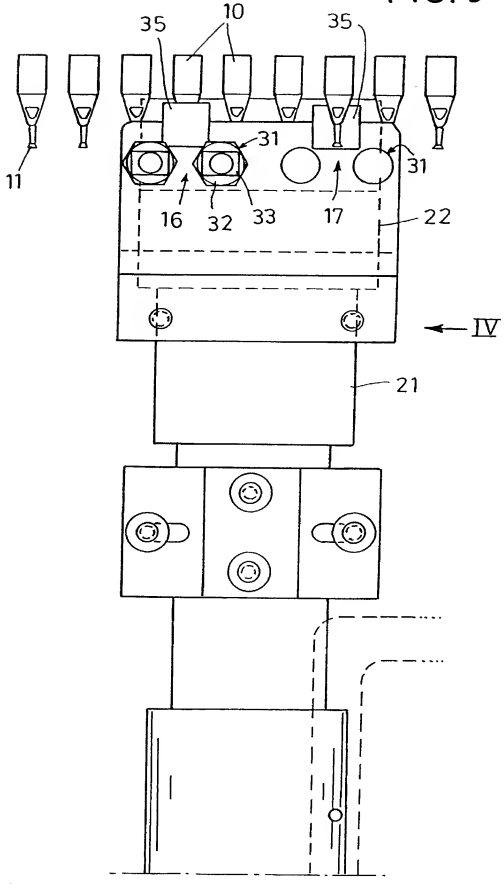
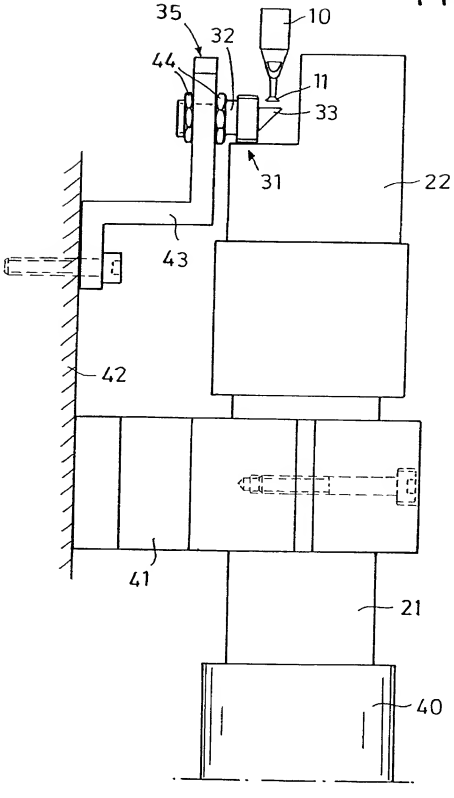


FIG. 4



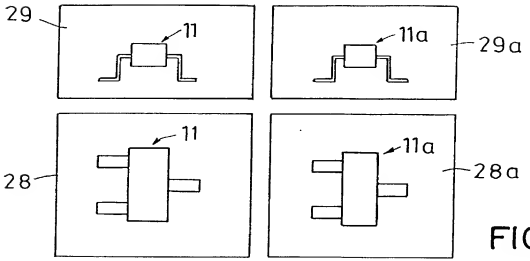


FIG.5

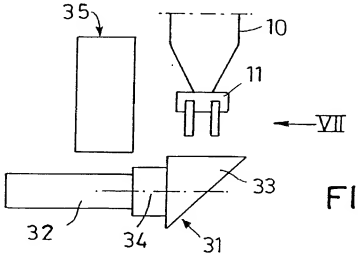


FIG.6

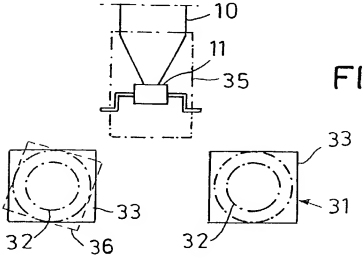


FIG.7

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum
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(26) Veröffentlichungssprache: Deutsch

(30) Angaben zur Priorität:
199 34 619.4 23. Juli 1999 (23.07.1999) DE

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(81) Bestimmungsstaaten *(national)*: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW.

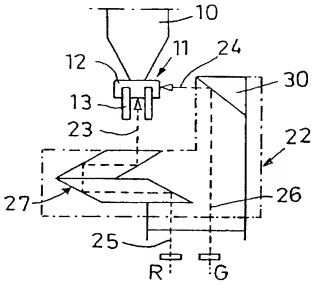
(84) Bestimmungsstaaten *(regional)*: ARIPO-Patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), eurasisches Patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europäisches Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI-Patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Veröffentlicht:
— *Mit internationalem Recherchenbericht*

Zur Erklärung der Zweibuchstaben-Codes, und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

(54) Title: INSPECTION DEVICE FOR COMPONENTS

(54) Bezeichnung: INSPEKTIONSVORRICHTUNG FÜR BAUTEILE



(57) Abstract: According to the invention, the components (11) to be tested are held on a suction support device (10) and are inspected by a video camera. The workpiece is filmed from two different sides by different beam paths (25, 26) of the same video camera in which two images of the same object are reproduced in different views and are analyzed by image processing. It can thus be determined whether the component (11) is intact and especially whether the limbs (13) thereof are present and whether they are located in the right location.

(57) Zusammenfassung: Die zu prüfenden Bauteile (11) werden an einer saugenden Tragvorrichtung (10) festgehalten und von einer Videokamera inspiziert. Das Werkstück wird von zwei verschiedenen Seiten durch unterschiedliche Strahlenwege (25, 26) von derselben Videokamera aufgenommen, in der zwei Bilder desselben Gegenstandes in unterschiedlichen Ansichten wiedergegeben und durch Bildverarbeitung ausgewertet werden. Dadurch kann festgestellt werden, ob das Bauteil (11) intakt ist, und insbesondere seine Beine (13) vorhanden sind und sich an der richtigen Stelle befinden.

WO 01/08461 A1

PLEASE NOTE: YOU MUST COMPLETE THE FOLLOWING

COMBINED DECLARATION AND POWER OF ATTORNEY FOR PATENT AND DESIGN APPLICATIONS

ATTORNEY DOCKET NO.

As a below named inventor, I hereby declare that: my residence post office address and citizenship are as stated next to my name; that I verily believe that I am the original, first and sole inventor (if only one inventor is named below) or a joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled: *

Insert Title

An inspection device for components

Check Box If Appropriate — For Use Without Specification Attached

the specification of which is attached hereto unless one of the following boxes is checked:

☐ The Specification was filed on _____ and was assigned Serial No. _____ and was amended on _____

☒ was filed as PCT international application number PCT/EP00/06117 on June 30, 2000 and was amended under PCT Article 19 on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information material to patentability as defined in Title 37, Code of Federal Regulations, §1.56.

I do not know and do not believe the same was ever known or used in the United States of America before my or our invention thereof, or patented or described in any printed publication in any country before my or our invention thereof, or more than one year prior to this application, that the same was not in public use or on sale in the United States of America more than one year prior to this application, that the invention has not been patented or made the subject of an inventor's certificate issued before the date of this application in any country foreign to the United States of America on an application filed by me or my legal representatives or assigns more than twelve months (six months for designs) prior to this application, and that no application for patent or inventor's certificate on this invention has been filed in any country foreign to the United States of America prior to this application by me or my legal representatives or assigns, except as follows:

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below:

Prior Foreign Application(s)

Insert Priority Information (If appropriate)

(Number)	(Country)	(Month/Day/Year Filed)	Priority Claimed
199 34 619.4	Germany	07/23/1999	☒ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No
			☐ Yes ☐ No

All Foreign Applications, if any, for any Patent or Inventor's Certificate Filed More Than 12 Months (6 Months for Designs) Prior To The Filing Date of This Application:

Country	Application No.	Date of Filing (Month/Day/Year)

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status — patented, pending, abandoned)

*NOTE: Must be completed.

I hereby appoint the following attorneys to prosecute this application and/or an international application based on this application, and to transact all business in the Patent and Trademark Office connected therewith and in connection with the resulting patent based on instructions received from the entity who first sent the application papers to the attorneys identified below, unless the inventor(s) or assignee provides said attorneys with a written notice to the contrary:

Vincent L. Ramik - Registration No. 20,663

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full Name of First or Sole Inventor: Insert Name of Inventor Insert Date This Document Is Signed	GIVEN NAME: Peter — FAMILY NAME: BOLLINGER	INVENTOR'S SIGNATURE	*DATE: 4-2-02
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Full Name of Fourth Inventor, If any: see above	GIVEN NAME / FAMILY NAME	INVENTOR'S SIGNATURE	*DATE
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	POST OFFICE ADDRESS (Complete Street Address including City, State & Country)		
Full Name of Fifth Inventor, If any: see above	GIVEN NAME / FAMILY NAME	INVENTOR'S SIGNATURE	*DATE
	RESIDENCE (City, State & Country)	CITIZENSHIP	
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*Note: Must be completed — date this document is signed.

(USPTO Approved 3-90)